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LETTER
OF
GAIL BORDEN, JR.,
TO
DR. ASHBEL SMITH,
SETTING FORTH AN IMPORTANT INVENTION IN THE
PREPARATION OF
A NEW ARTICLE OF FOOD,
TERMED
MEAT BISCUIT;
AND
THE REPLY OF DR. SMITH
THERE TO;
BEING A LETTER ADDRESSED
TO THE
AMERICAN ASSOCIATION
FOR THE PROMOTION OF SCIENCE,
AT THEIR SEMI-ANNUAL MEETING, TO BE HELD AT CHARLESTON
IN MARCH NEXT.
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INTRODUCTION:

The history of the following correspondence is briefly this: I wrote a letter to Dr. Ashbel Smith on my invention of the meat biscuit, to which he replied by addressing a letter to the American Association for the advancement of Science, at the semi-annual meeting, to be held in Charleston, S. C., next month. Dr. Smith, having shown me a copy of his letter, I asked his permission to communicate copies of the same to other parties, to which he consented. To avoid the trouble of frequent copying in manuscript, I have thought proper to have a number of copies of the correspondence printed for private circulation, in order to invite the attention of practical scientific men to my discovery or invention.

G. BORDEN, JR.

GALVESTON, February 15th, 1850.

OF
GAIL BORDEN, Jr., OF GALVESTON,
TO
DR. ASHBEL SMITH,

Setting forth an important invention in the preparation of food, termed **MEAT BISCUIT**, and the reply of Dr. Smith thereto, being a letter addressed to the American Association, for the promotion of Science, at their semi-annual meeting to be held at Charleston in March next.

GALVESTON, January 21st, 1850.

DR. ASHBEL SMITH—*Dear Sir*: Last July while attempting to prepare some portable food for a few friends going to California, I made an important discovery, to wit: that of a new process of preserving the nutritious properties of meat; and having taken the necessary steps to secure a patent for the invention, (mainly with a view to insure the integrity of the manufactured article,) I am now advised to bring the discovery to the notice of the government.

To this end I have already sent specimens of the *Meat Biscuit* to several scientific and practical men: and also to surgeons, and others connected with the Army and Navy of the United States, to whom I have also written in relation to the nature of my discovery, or invention, and its uses, requesting them to test the article, and to give me their opinion of its merits and importance.

The high eminence to which you have attained in a knowledge of the arts and sciences, induces me to request that you will notice this discovery: and I should be pleased, likewise, to have an expression of your opinion upon its merits, and the adaptability of the article to common and general use; and for your further information, permit me here to repeat what I have said to those gentlemen and others, in relation to the subject:

First, then, the nature of my discovery or invention, consists in an improved process of preserving the nutritious properties of meat, or animal flesh, of any kind, by obtaining the concentrated extract of it, and combining it with flour or vegetable meal, and drying or baking the mixture in an oven, in the form of a biscuit or cracker.

This meat bread, or as Messrs. Munn & Co., of the Scientific American, call it "*portable desiccated soup bread*," contains a large amount of the most important alimentary substances, in a very small bulk, and a convenient form, well adapted to the use of seafaring persons, travellers, hospitals, public institutions and private families.

One pound of this bread contains the essence, or extract, of more than *five* pounds of meat, (including its usual proportion of bone,) and *one ounce* of it will make a pint of rich soup; and its strength and power of nutrition may be estimated by the comparison of the small quantity which it requires to make so large a quantity of soup, to say nothing of its other great and superior advantages, which I will speak of more at large hereafter.

It has been suggested to me, to put into the composition, during its manufacture, spices and other condiments: but after reflection I have concluded not to do so, for it not unfrequently happens, that these articles are put into prepared meats and portable soup, to conceal the bad quality of the meat of which they are made, and to disguise the offensive flavor and other defects arising from this and other causes in its manufacture, on which account

many persons object to their use ; whereas, the article I propose to furnish, unmixed as it is with spice, pepper, or even salt, may be judged of as to its genuineness and purity, by any one desiring to use it ; nor does there seem to me to be any sufficient reason for adding these condiments, for these things require no expensive case or covering to preserve them in their original strength and purity, and may be used at the time of cooking with equal convenience, and (which is a further advantage) in such proportions as to suit the ever varying tastes of different individuals.

Since the discovery of preserving the essence or extract of animal flesh by combining it with the staff of life, I have made improvements, not only in the manufacture, but of the mode of preparing it for use : and I entertain no doubt of the success of the meat bread, when properly tested. But, recollecting the ill-success which the Indian or corn meal met with recently in Great Britain, on account of prejudice and ignorance as to the proper mode of cooking it, I am the more anxious that a fair trial of the article should be made by *practical*, as well as professional men.

I would remark, that I expect to make a still further improvement by the employment of suitable apparatus, by which the nutritious properties of the meat will be separated from the corporeous parts by *steam*, and the broth evaporated by means of the *vacuum process*. This is the manner in which refined sugar is made from the juice of the cane : and it is believed that the same process applied to the manufacture of the meat bread, will exhibit as great an improvement in its strength, purity and its cheapness, as has attended its application to the manufacture of the sugar.

I have manufactured some 600 pounds of this meat bread, but having hitherto no suitable apparatus to apply any greater heat than boiling water, I have necessarily lost much of the nutriment contained in portions of the meat, which give to soups a richness, both palatable and alimentary.

It may be proper to remark, that I have made experiments not only with beef, but also with veal, pork, fowl, fish and oysters, and a friend of mine at Goliad, having kindly offered to send me a tortoise of Aransas bay, I propose to make a portable soup bread, by which such interior cities and localities as cannot supply themselves with the original animal, may be enabled to regale themselves upon the genuine "*turtle soup*." But I must further remark that beef, so far as my observation extends, makes a better article than veal. Young meats, I find, are like unripe fruits, they are tender and palatable, but not so nutritious nor so easily digested as those which are matured.

One word with regard to the invention. Perhaps it may be said that the extracting of the essence of meat is no new thing ; I am aware that it is not. Messrs. Munn & Co., in a letter to me on the subject, under date of 24th October last, say, that "the mode of preparing the concentrated liquid, or paste beef, has been long known to the world, such as is described in Gray's or Liebig's chemistry, but, as combined with flour and made into bread, as claimed by you, is entirely new to us, and we do not think any such process has ever been used before your discovery. The plan is, in our opinion, a valuable one."

I am also aware that the essence, or concentrated extract, has been brought into solids like glue ; but this is an operation that cannot be easily effected in climates that are either warm or humid : and in those climates where it can be done, the article is found to be too expensive for common use. I was, myself endeavoring to make this glue extract for some friends going to California, when I made my discovery. I had set up a large kettle and evaporating pan, and after two days labor I reduced one hundred and twenty pounds of veal to ten pounds of the extract, of a consistence like melted glue and molasses ; the weather was warm and rainy, it being the middle of July. I could not dry it either in or out of the house, and unwilling to lose my labor, it occurred to me, after various expedients, to mix the article with good flour and bake it. To my great satisfaction, the bread was found to contain all the primary principles of the meat, and with a better flavor than simple veal soup, thickened with flour in the ordinary method.

This process of mixing and baking, I found to be easily and quickly done, and to answer the double purpose of concentrating in the same cake, the nutritious properties of animal and vegetable food, so essential to the healthful sustenance of man. This extract of

animal flesh may also be combined with corn, or other vegetable meal, and for some marine purposes, I intend to employ the potato and other antiscorbutic vegetables, having farinaceous qualities, to desiccate the extract.

Nor am I ignorant that portable soups and concentrated meats, preserved in hermetically sealed vessels, have been long known and used, but were very inconvenient to pack and carry, and liable to deteriorate. My meat biscuit is as convenient and portable as any other hard biscuit. Besides, these liquid soups have the objections before mentioned: they are so drugged with high seasoned condiments, that it is difficult to know of what meats they are made.

From what I have already said of my efforts to make the glue, I feel justified in affirming, that it is difficult of manufacture, if not altogether impracticable, (as I have found it,) in a moist and warm climate. My invention discloses a process by which, after obtaining the extract, the desiccated soup bread may be ready for packing away in less than sixty minutes. And the facility and cheapness with which, by proper apparatus and machinery, this bread can be made by my process, will enable not only seafaring men and travellers to use it, but it can be exported for common use to every country where meat is scarce and dear.

I propose, during the ensuing spring and summer, to erect an establishment, and to put up apparatus and machinery, by which I can manufacture twenty beeves, or ten thousand pounds of beef, or other edible meat, per day. I am not able as yet to say how cheap the bread can be manufactured on an extensive scale, and by the aid of these improvements: but I can inform you, that so far as my experiments have gone, I find it, even in the clumsy manner in which I have hitherto manufactured it, much the cheapest and best way of making soup for family use.

With respect to the use and advantages of the meat bread, I would say, that

To the *NAVY* and *every MARINE* service, it would be invaluable. The health of seamen would be preserved, and their comfort increased by the use of it. Having the quality and flavor of meat, fresh from the slaughter, it would doubtless prove antiscorbutic; and therefore, with the sailors' salt provision, would be of the utmost importance. It can be cooked with great advantage with many other articles of diet: one day a soup with hard biscuit,—the next with beans or peas,—the third with rice, thus having a fresh article of meat every day.

To *TRAVELLERS*, on long journeys, through destitute regions, this meat bread will be of great benefit, and of incalculable value.

The *GEOLOGIST* or *SURVEYOR*, with a few ounces of this bread in his pocket, can, with a hunters cup, make a dish of good palatable and nutritious soup in a few minutes.

For *EXPLORING* expeditions, and parties of reconnoissance, it would be found very useful. Those persons employed in making geological and mineralogical surveys of our newly acquired territories, as well as those running the boundary, would realize an immense saving of expense and labor by the use of this meat bread.

It will also be found most convenient and useful for *HOSPITALS*. A patient can, at shortest notice, have it prepared to any degree of nutrition, from a weak broth to ^{the} most nutritious soup. The absence of grease from the composition, while it possesses the nutritive qualities of the meat, renders it peculiarly adapted for the use of invalids.

For *FAMILY* use, this meat bread will be found very convenient, and especially so in warm weather, as it requires little fire (or a lamp of alcohol) to prepare it. The various ways in which it can be served up, will be explained in the "directions for cooking," accompanying each package.

You will remember that the combination is simply the extract of meat, with flour or vegetable meal: and to make a palatable soup, it should at least be seasoned with salt and pepper. In judging of the merits of this meat biscuit, you must not expect to find anything better than can be made with fresh meat, and the article with which it is combined; but the great excellence is, that the meat in this form is always fresh—a desideratum not only to the mariner, but to all others.

I have not sold a pound of this meat bread as yet, and lest a spurious article should be offered, I do not intend to do so, until I am prepared to manufacture it on a larger scale:

and I will then only sell through responsible agents. I would here remark, that should I obtain a patent, I do not intend to sell rights to manufacture the article, except to the most responsible persons, such as are able to carry it on in a *public* place, on an extensive scale. When the public can witness this meat bread manufactured of a good article of fat meat, either beef, mutton, pork, or other edible flesh, the importance of this new article of diet will be seen and appreciated: its use become common, and a new avenue for the market of beef, pork and other meats, will be opened. This meat bread will be manufactured where meats are plenty and cheap, and exported to countries where they are both scarce and dear, thus proving mutually beneficial to the producer and consumer.

This meat bread should be made of fat and well-conditioned animals; for it is only in such that the nutritive and alimentary properties of meat are contained; besides, it is more profitable, as grease forms no part of the composition of the bread, it will pay much of the expense of the manufacture. In Texas, the hide, tallow and grease of a fat beef, will pay for the animal on foot. From this, it may be inferred, that the meat biscuit can be manufactured at a rate which will justify its use by all who can use meat in any form whatever.

The quality of this meat bread depends upon the *integrity* of its manufacture: and to insure this object, I have applied, as I have already said, for a patent, and from the favorable opinion expressed of its novelty and utility by Messrs. Munn & Co., as well as by others in this state, skilled in the preservation of meats, I have no doubt of obtaining the right to the invention, and thereby be enabled to control and insure the manufacture of a genuine article.

Capt. Jno. G. Tod, believing the discovery a valuable one, and especially for the *navy* and *military* corps, on detached service, proposes to bring the subject before the government.

If the government will adopt the article as part of a ration for her seamen, say one ounce each per day, I can furnish a genuine article, upon a reasonable notice, and at a rate less than the whiskey ration, which I understand is to be abandoned, and some article of diet substituted, and what better than a bowl of good fresh soup?

To advance this object, we have, as stated in the beginning, requested several practical gentlemen to test the article by a careful examination of its qualities and use. For this purpose, likewise, I wish you to forward the parcels herewith accompanying, to such of your friends as will take the trouble to investigate the subject.

Respectfully your obedient servant.

G. BORDEN, JR.

EVERGREEN, GALVESTON BAY, February 1st, 1850.

To DR. ALEXANDER DALLAS BACHE, *President of the American Association,*
for the advancement of Science, etc., etc., etc.

I have received from Mr. Gail Borden, Jr., a highly respectable citizen of this state, the accompanying letter, to which I beg to invite the attention of your learned body. Mr. Borden claims, as you will see, to have discovered a process for combining in a cheap, convenient and portable form, all the nutritive portions of animal and farinaceous food. His invention has the further advantages that all refuse, excrementitious and superfluous matters are rejected; and that the meat biscuit, for so Mr. Borden denominates his prepared article, can be preserved *fresh*, without condiments or preservatives of any kind, for years, and in all climates—care only being taken that it be kept dry. From several satisfactory trials, it is proved that Mr. Borden's process is equally adapted for combining any farina, any flour, or meal; with any of the meats of the animal kingdom used by man for food: but he has hitherto confined himself to combining wheat flour with the flesh of neat cattle.

I have examined with careful attention, and have several times eaten of the soup made of the meat biscuit—but, before speaking further of its uses, I will briefly allude to the manner of preparing the biscuit in question. The nutritive portions of the beef, or

other meat, immediately on its being slaughtered, are, by long boiling, separated from the bones and fibrous and cartilaginous matters: the water holding the nutritious matters in solution, is evaporated to a considerable degree of spicitude—this is then made into a dough with firm wheaten flour, the dough rolled and cut into the form of biscuits, is then desiccated, or baked in an oven at a moderate heat. The cooking, both of the flour and the animal food, is thus complete. The meat biscuits thus prepared have the appearance and firmness of the nicest crackers or navy bread, being as dry, and breaking or pulverizing as readily as the most carefully made table crackers. It is preserved in the form of biscuit, or reduced to a coarse flour or meal. It is best kept in tin cases hermetically soldered up; the exclusion of air is not important, humidity alone is to be guarded against. I have seen some of the biscuit perfectly fresh and sound that have been hanging in sacks since last July in Mr. Borden's kitchen: and it is to be borne in mind, that in this climate articles contract moisture and moulder promptly, unless kept dry by artificial heat.

For making soup of the meat biscuit, a batter is first made of the pulverized biscuit and cold water—this is stirred into boiling water—the boiling is continued some ten or twenty minutes—salt, pepper, and other condiments are added to suit the taste, and the soup is ready for the table. I have eaten the soup several times,—it has the fresh, *lively*, *clean*, and thoroughly done or cooked flavor that used to form the charm of the soups of the Rocher de Cancale. It is perfectly free from that rapid unctuous stale taste which characterizes all prepared soups I have hitherto tried at sea and elsewhere. Those chemical changes in food which, in common language, we denominate *cooking*, have been perfectly effected in Mr. Borden's biscuit by the long continued boiling at first, and the subsequent baking or roasting. The soup prepared of it is thus ready to be absorbed into the system without loss, and without tedious digestion in the alimentary canal, and is in the highest degree nutritious and invigorating. It is to be noted, moreover, that the meat biscuit is manufactured without salt, pepper, or any condiment or chemical antiseptic whatever: thus the *freshness* or peculiar properties inherent to recently slaughtered meat are preserved, and a simple and perfect guarantee furnished of the goodness of any particular parcel. To the soup made of Mr. Borden's biscuit, as already intimated, salt and the various condiments used in soups may be added to suit the taste; also, toasted bread, vegetables, etc., etc., as circumstances permit and fancy suggests, until the varied catalogue of the *potages* of the restaurateurs may be rivaled.

The different portable soups and prepared meats for long voyages, which I have seen, answer only imperfectly the ends for which they have been designed. Being prepared more or less with condiments, these meats differ from freshly slaughtered animal food; they contain fibrous and indigestible portions, being more or less liquid in form, they are inconvenient to carry, and besides, thus necessitate the transportation of useless bulk. The meats put up for long voyages, in the manner just alluded to, are not wholly freed from fatty matters: these undergoing slight chemical changes in time, impair both the taste and quality of the food, into which they enter; nor are these meats so completely cooked as by Mr. Borden's double process of boiling and baking.

I might here insist on the very great conveniences of Mr. B.'s meat biscuit arising from its dryness. For long voyages, it is best preserved in soldered tin cases or tight casks: but it may be carried in sacks, suspended from one's saddle bow, for weeks or months over the prairies, or through the desert, without risk of spoiling, using care to keep it dry; and when a case or cask is opened, it may be economised for days or weeks, according to circumstances: whereas the liquid portable soups and prepared meats must be at once eaten, or they soon spoil, especially in damp or hot weather.

As no condiments nor chemical preservatives enter into the meat biscuit, it retains unchanged and unimpaired, all its qualities of freshly slaughtered meat: and as already intimated, furnishes its own evidence and guarantee of soundness at the time of using.

As the meat biscuit requires only ten to twenty minutes to be made into a hot delicious soup, with the aid of fire and water only, its advantages for family use, for hospitals, at sea, and on long journeys, over land, and wherever it is desirable to prepare food promptly, must be obvious.

The paramount excellence of Mr. B.'s discovery, appears to me to consist in this, that it is a meat biscuit—it is meat *and* bread. Human life may be sustained, as we all know, on a diet of a single kind, but the highest degree of corporeal and mental strength and health can be long maintained only by the use of both vegetable and animal food; especially when labors, fatigues and privations are to be undergone. I believe there does not exist in nature or art the same amount of nutriment in as small bulk or weight, and as well adapted to support, efficiently and permanently, mental and physical vigor, as is concentrated in the meat biscuit in question. One ounce of the biscuit meal makes a pint of rich, invigorating animal and farinaceous soup. The biscuit being converted into soup by its combination with water, all the requirements of a good food are answered, animal and vegetable aliment in a sufficient *bulky* form.

Dr. Franklin has observed in his memoirs, that the nutriment of a half pennyworth of malt only is contained in a pint of ale: this is one of the very few errors into which that practical philosopher fell. As in malt liquors, so in soups, there is a chemical union of the alimentary matters with the water, and we have in soup the *bulk* and *Aliments* of the *Union* water, as well as the animal and vegetable principles, *all* which are necessary for sustaining the human system. I mention this to illustrate the fact, that soup made of the meat biscuit will go as far in supporting life, as several times the like quantity of *dry* bread and meat, with water separate as a beverage.

If my limits permit, I shall further on, cite some facts to show that the meat biscuit can be prepared at a very low price, in countries where, as in Texas, beeves on foot are extremely cheap: from its small bulk, the cost of transportation to other countries will be light.

We have thus, in the meat biscuit, an article of food, partly farinaceous, and partly animal, such as the system requires for long continued use; it is easily preserved in all climates, seasons and circumstances—it is in a form the most concentrated and convenient for carriage—it is prepared with little trouble, and speedily; by its cheapness, it is accommodated to universal use.

The advantages of the meat biscuit, for hospitals, are obvious; a nice, cheap, fresh, invigorating and easily digestible soup can be prepared in a few minutes, at the moment almost, when the taste and condition of the patient require it.

For private families, and especially small ones, and in the warm season, it is convenient by dispensing with the long hours of boiling required to prepare ordinary soups.

On long sea voyages, it furnishes at a cheap rate, that indispensable requisite of health and preventive of scurvy, an occasional ration of fresh meat. But it is not for long voyages alone, to which it is adapted. Every one who has been at sea, knows the sparing use of fire on board ships. What could be more grateful, invigorating and healthful for the sailor, dripping with water, and shivering with cold, than a bowl of hot soup, well seasoned with pepper, or other warming condiments? and how vastly more salutary than the ration of grog!

It appears to be a part of the mission of America, if I may use the phraseology, not merely to furnish a home to refugees from the oppressions and crowded population of the old world, but also, to feed in part, the poor of those countries who *never taste good* meat: and to whom, even a miserable flesh is a great rarity. Baron Dupin, in 1815, estimated that two thirds of the French nation did not taste meat once a week, and such meat as falls to the lot of the poor; my personal observation confirms his statement; and this is deemed too, a favorable average for the continent of Europe. The destitution of the starving Irish has, through the newspapers, been made painfully familiar to everybody. The meat biscuit can be furnished at such rate, and at so small a cost of transportation, that a meal of *sound* animal food may be in reach of almost every pauper and every beggar in Europe, unless its introduction be debarred by restrictive duties.

There are other uses nearer home which would furnish a market for, and be greatly benefitted by the meat biscuit. Without mentioning more particularly our plantations, I will barely allude to the fact, that immense quantities of jerked beef are annually imported from South America into Cuba, for the sugar and coffee plantations of that Island;

with equal freedom to import the meat biscuit, the latter would drive the jerked beef from the market.

The uses of the meat biscuit hitherto mentioned, apply to ordinary life; there are other wants and necessities which may be considered as in some degree new or occasional, developed, in part, by the spirit of enterprize which characterizes the age we live in: in part, by new discoveries and great political changes, which wants and necessities can be met and answered adequately only by the meat biscuit. I refer to enterprises, where, with small means of transportation, regions are to be visited containing only scant supplies, or wholly destitute of provisions; as in traversing wildernesses of days' and in weeks' journeys each—such as the vast solitudes in the interior of our great western territories, where, under the most favorable circumstances, the local means of subsistence are extremely scanty and precarious; and where, amid the vast mountain ranges to be crossed, travellers may be overtaken with snows of weeks, and even months duration—such also as in journeys over the sandy *jornadas* of Mexico; or in traversing the almost boundless deserts of central Africa, or in penetrating the regions of eternal winter which surround the poles. For all such enterprises, whether of war, or peace, of commerce, or science, the meat biscuit is pre-eminently adapted; furnishing ample nourishment, so small in bulk, and so light of weight, as to admit of easy transportation. On expeditions in inhospitable regions, such as alluded to, to enable the system to withstand the extremes of heat or cold, or the influence of pestilential climates, it is not enough to possess the means of merely keeping body and spirit together; success and safety, amid the privations incident to such exposure, depend on maintaining the mind in high tone, as well as the body; for this purpose a good nourishing diet, consisting both of animal and vegetable food, such as furnished by Mr. Borden's discovery, is absolutely necessary. The English in their East Indian expeditions, used, some years since, to take supplies of animal glue, with which they made soup; so far as I know, they still do so. The meat biscuit is in every respect, a greatly superior article: as well as to *pemmican*, still used on long sea voyages.

The settlement of Oregon, and the incorporation of the Californias into our Union, render a direct communication overland with those distant territories, one of the most urgent political and industrial wants of our country. A vast railroad has been projected; under the most favorable circumstances long years must elapse before it could be constructed; it is proposed, in the mean time, to pierce the continent at one or more of its narrow isthmuses further south, as an imperfect substitute for direct communication—themselves most gigantic enterprises. All the while with the rapid progress of our people westward, the necessity of a direct intercourse with the Pacific regions, and with the vast intervening districts, for the purpose of making settlements, is more and more imperative.

One ounce of the meat biscuit makes a pint of rich nutritious soup. Five ounces a day, or a pound for three days, would be an ample supply for one man. Three hundred pounds is commonly estimated a mule load; let us take half this weight, or one hundred and fifty pounds as a load, as subsistence for the mule is scanty in places, and the journey long, we see that a light mule load will alone support, in high health, seven men upwards of two months. The meat biscuit is the bridge across the wilderness, it is the true manna in the desert.

The iron men of the frontier may, with perhaps a little parched corn in their pockets, plunge boldly into the wilderness, relying for subsistence on their rifles: Even they must not go in too large companies; but the difficulties to be encountered are not imaginary, as the privations and disasters of numerous expeditions since the discovery of the California mines too well testify. A company started from Galveston for California by the overland route; they were reduced to eat their mules, and at length compelled to return, without accomplishing their journey. A few pounds of the meat bread would have obviated this calamity and disappointment.

The newspapers have made the country familiar with the frightful sufferings of Col. Fremont's late expedition to discover a route south of the South Pass, and with the disastrous fate of some of his companions. These men who perished miserably on their way, on foot, to the settlements, might have easily carried, even in their coat pockets, enough of the meat

biscuit, with the aid of a tin cup and box of matches, to have enabled them to reach the settlements in health and safety. Ten pounds, a weight easily packed by a foot traveler, is sufficient for thirty days' subsistence. The fire for cooking is one of the greatest dangers in the Indian country, as it betrays the situation of the camp to the hostile Indian; the advantage of a small and momentary flame, such as is adequate to prepare the meat biscuit, will not be lightly estimated by persons whose path has been among hostile Indians. Our frontier, it is to be feared, will be long subject to Indian depredations. Mr. Borden's discovery greatly adds to our means of prompt and efficient pursuit and protection.

Indeed, I feel quite confident that the meat biscuit will, ere long, form a part of the indispensable supplies of every expedition into our western wilds, and of every military corps on our frontier.

Every one familiar with the recent Mexican campaigns, remembers the delays and embarrassments occasioned by want of rations of easy transportation. It was often impracticable to pursue, even a small corps of the enemy. A similar want has been the chief difficulty experienced by the French in the subjugation of Algiers; for want of subsistence, the French troops could not pursue the Arabs in their razzias, on their retreat to the mountain fastnesses. We have here the means of obviating similar difficulties, delays, and embarrassments hereafter. Every invention which shortens war, is a gain to humanity.

Expeditions are in progress to discover Sir John Franklin, who, if alive, is probably frozen up in regions of eternal snow. Where ships are detained by ice for months, or crushed and destroyed by it, the seamen may make good their retreat, provided they can carry food enough to serve them by the way. I need not allude particularly to cases where ship's crews are compelled to take to their boat, or the thousand similar casualties to which they are liable.

For upwards of a thousand years, science, commerce and philanthropy have cast wistful and longing eyes toward that vast terra incognita, hidden in the interior of Africa. An opinion has long prevailed that in the hitherto inaccessible regions of that immense continent, mineral wealth, vegetable productions, animals, and perhaps, forms of civilization exist, as yet unknown to the rest of the world. Among the formidable obstacles to be encountered in penetrating thither, has been the want of a suitable food to sustain life on the journey from the coast. The vegetable gum, known as gum Arabic, has been the chief, and indeed, often, the sole resources of the traveler over the desert, and through the swampy countries—this barely supports life, but does not impart the mental and physical vigor requisite to resist the prostrating influences of those hot and deadly climates. Mr. Borden's discovery supplies this want; light and not bulky, and not liable itself to be spoiled and rendered unfit for use by the climate.

To enumerate the various uses for ordinary life, and new occasions which the meat biscuit may subserve, would extend this already long letter to a most unreasonable length;—they will become more and more obvious on reflection, to every man of observation; but it would, after all, be a discovery of only limited utility, unless it can be furnished at so low a price as to enter into free competition with the ordinary means of subsistence. From conversation with Mr. Borden, and learning the manner of preparation, and the cost of materials, I am satisfied it may be one of the cheapest articles of food. Putting it up in tin cases or casks, costs less than barreling a like amount of beef; being much smaller in bulk, and dry, its transportation is less. Indeed, it may be taken where the cost of freight on beef or pork would debar the introduction of these latter articles. Among our staple productions in Texas, are beef cattle, which find abundant pasturage on the broad prairies at all seasons—the cost of beef on foot, may be estimated at one and a quarter cent per pound.

Public confidence, in an article like the one which forms the subject of this letter, depends greatly on a well-grounded assurance of its careful and correct preparation. Being made without any condiments, or chemical antiseptic, its taste and smell are, at all times, evidence of its soundness and faithful manufacture.

It has appeared to me, that an invention promising so much practical convenience and utility, deserves the examination and judgment of your learned association. I shall accordingly forward to Charleston, in time for your semi-annual meeting, next month, in that

city, some of the parcels of meat biscuit placed at my disposition by Mr. Borden. It is also my intention to transmit others of the parcels to the American Medical Association, which will meet in Cincinnati in June next, for their examination and judgment.

I have the honor to be, Mr. President and Gentlemen, Members of the American Association for the advancement of science,

Your very obedient servant,

ASHBEL SMITH.

NOTE.—Since the above letters were put in type, Mr. Borden has received intelligence of the granting of letters patent for the invention, vesting in him and his legal representatives the exclusive right to the same.—*Publishers.*



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